Problem H: Almost Magic Squares

Tortoise: Achilles, I wanted to thank you for the present you gave me the other day. But, on this occasion, I have a couple of gifts for you.

Achilles: Really? How thoughtful of you. And you say they are two gifts? You are too kind. . .

Tortoise: This is the first one. It is a metallic bar, exactly one metre long.

Achilles: Thank you. . . I. . . didn't have one. I guess there is something special about it, right?

Tortoise: Well, it's mainly symbolic. It's a reminder of the fact that *infinity* is all around us, even if we live in a seemingly *finite* Universe. Take this bar, for example. Somewhere in that bar is encoded all the knowledge of this world. Everything that has ever been, and will ever be.

Achilles: I must be missing something. Are you telling me that this small bar somehow *knows* everything? How is that even possible?

Tortoise: Here's one way to think about it: take the English alphabet. Assign a numeric "code" to each letter; for example, *A* could be 01, *B* could be 02, and so on. You could also assign codes to every punctuation mark and any other symbol you like. Now, you could take every book in every library in the world, and translate their contents into your code. If you concatenate all those codes, you would end up with an integer number. A very big number, but a number nonetheless. Now, put a zero and a decimal point before that number. Now you have a rational number between 0 and 1. Think of that number as a length in metres, and then it would represent an exact location inside that bar. That location *encodes* the content of all the libraries in the world.

Achilles: Wait. . . are you serious? How can it. . . how could. . . I think I need to sit down for a minute.

Tortoise: Unfortunately, we cannot get even close to that level of physical "reality", but it's still a beautiful thing to think about, don't you agree? Think of how powerful it is to do something as simple as encoding information. That's why I like binary numbers so much. . . which takes me to my second gift. I know you like mathematical puzzles.

Achilles: Yes I do! I love to start my day with one.

Tortoise: I'm glad, because I designed a special puzzle just for you. Do you know what a *magic square* is?

Achilles: Yes. They are those matrices of numbers where every row, column and both diagonals sum up to the same number, right?

Tortoise: Correct. Well, I've created a puzzle using "almost–magic" squares. They are matrices where the rows and columns add up to the same number, but the diagonals may not. I take an almost–magic square of size $N \times N$ where the rows and columns add up to some value X, and then pick a set S of K numbers at random from the square (K no greater than $N-2$). I then alter the numbers in S as follows: I add 2^0 to S_1, 2^1 to S_2, 2^2 to S_3 and so on, up to S_K, which is increased by 2^{K-1}. Your job is to find the value X, and the positions of the numbers $S_1, S_2, \ldots, S_K$ inside the square.

Achilles: It sounds like an interesting challenge, but I think I'd like to see an example first.

Tortoise: Okay, consider this square of size 3×3. . .

You receive a matrix of $N \times N$ integers, where every row and column originally added up to some value X. However, K numbers in the square were altered using the Tortoise's method. Determine the value of X, and the positions of all the K numbers.

Input

Input starts with a positive integer **T**, that denotes the number of test cases. Each test case starts with a blank line. The next line contains two integers: **N** and **K**.

The next N lines contain N integers separated by one or more single spaces, and describe the contents of the altered almost–magic square. You may assume the the sum of all elements of the square is never greater than $60,000$.

$T \leq 500$; $3 \leq N \leq 15$; $1 \leq K \leq (N-2)$

Output

For each test case, print the case number, followed by the value of X in the same line. Then print K lines, and in the ith line ($1 \le i \le K$) print two numbers **r** and **c** separated by a single space ($1 \le r, c \le N$), representing the row and column where S_i is located.

Sample Input	Output for Sample Input

<pre>2
 	
3 1
8 1 6
3 6 7
4 9 2
 	
5 2
16 23   5   8 14
22   6   6 13 20
3   10 12 19 21
9   11 18 25   2
15 17 24   1   8</pre>
	<pre>Case 1: 15
	2 2
	Case 2: 65
	1 4
	2 2</pre>